Amendments to the Claims:

Please cancel claims 2-8, amend claims 1, 9, 10 and 11, and add claims 12-32 as shown in the following listing of claims. This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) An omni-directional image and 3-Dimensional data acquisition apparatus, comprising:

a plurality of multi-camera modules positioned along the direction of height, each of the ~~a~~ multi-camera ~~module~~ modules including multiple ~~constructed in a manner comprising a plurality of~~ cameras that are ~~symmetrically~~ arranged ~~with a specific point in a plane~~ such that the optical centers of the multiple cameras are in a plane, the multiple cameras of the multi-camera modules being further arranged such that the optical axis of at least one of the multiple cameras from a first multi-camera module of the multi-camera modules at a first height is pointing in the same direction as the optical axis of at least one of the multiple cameras from a second multi-camera module of the multi-camera modules at a second height such that the optical axes are parallel; and, ~~each of the cameras taking charge of each of divided angles such that the camera module can take an omni-directional continuous panoramic photograph of surrounding objects with the specific point;~~

a vision computer system operatively connected to each of the multiple cameras of the multi-camera modules, the vision computer system being configured to process and store images acquired by the multiple cameras.

~~first frame grabbers each of which is electrically connected to each of the cameras of the multi-camera module, to grab photographed images by frames;~~

~~an exposure calculator electrically connected to the first frame grabbers, to calculate exposure of each camera, based on the grabbed images by frames;~~

~~an exposure signal generator electrically connected to each camera, to transmit information about the exposure as a signal on the basis of the exposure calculated by the exposure calculator;~~

~~storage means electrically connected to the each first frame grabber, to store images photographed by the cameras according to photographing location and photographing time;~~

~~a GPS sensor to sense the photographing location and photographing time;~~

~~an annotation entering unit electrically connected to the GPS sensor to calculate location and time corresponding to each frame based on sensed data of the GPS sensor, the annotation entering unit being electrically connected to the storage means to enter the calculated location and time in each frame as annotation; and~~

~~a trigger signal generator electrically connected the storage means, the exposure signal generator, the annotation entering unit, the trigger signal generator selectively transmits a trigger signal to the exposure signal generator or the annotation entering unit in order that the cameras start to photograph the objects according to the trigger signal; and wherein the multi-camera module are vertically stacked and formed in at least two layers in the direction of height.~~

2. (canceled).

3. (canceled).

4. (canceled).

5. (canceled).

6. (canceled).

7. (canceled).

8. (canceled).

9. (currently amended) A method for acquiring 3-dimensional data, the method comprising ~~the steps of~~:

acquiring first images using a multi-camera module comprising multiple cameras, including using at least some of the multiple cameras with the optical centers in a first plane at a first height to acquire the first images;

acquiring second images using the multi-camera module, including using at least some of the multiple cameras with the optical centers in a second plane at a second height to acquire the second images, the second plane being parallel to the first plane;

searching ~~for~~ corresponding points in one of the first images and in one of the second images ~~each image~~;

extracting ~~for~~ distance information for the corresponding points using trigonometry; and

acquiring ~~for~~ 3-dimensional data based on the distance information.

10. (currently amended) A method for extending dynamic range of images, comprising the steps of:

acquiring for ~~multi~~ multiple images of an object, the ~~multi~~ multiple images being photographed by ~~the~~ cameras of a multi-camera module which have different exposure amounts ~~amount each other~~, wherein the cameras ~~the multi camera module comprising a plurality of cameras which~~ are symmetrically arranged at a specific point in a plane, and which take charge of each allocating viewing angle calculated by 360° divided by the number of the cameras;

selectively extracting for regions in the ~~multi~~ multiple images, wherein the regions are included within the dynamic range of the cameras ~~camera~~; and

acquiring for images of dynamic range extension, which are generated by composing the extracting regions.

11. (currently amended) An omni-directional image and 3-Dimensional data acquisition apparatus, comprising:

a multi-camera module including ~~constructed in a manner comprised of a plurality of~~ multiple cameras that are ~~symmetrically~~ arranged ~~with a specific point in a plane~~ such that the optical centers of the cameras are in a plane, ~~each of the cameras taking charge of each of divided angles such that the camera module can take an omni-directional continuous panoramic photograph of surrounding objects with the specific point~~;

an elevator for elevating the multi-camera module vertically; and

a vision computer system operatively connected to each of the multiple cameras of the multi-camera modules, the vision computer system being configured to process and store images acquired by the multiple cameras.

~~first frame grabbers each of which is electrically connected to each of the cameras of the multi-camera module, to grab photographed images by frames;~~

~~an exposure calculator electrically connected to the first frame grabbers, to calculate exposure of each camera, based on the grabbed images by frames;~~

~~an exposure signal generator electrically connected to each camera, to transmit information about the exposure as a signal on the basis of the exposure calculated by the exposure calculator;~~

~~storage means electrically connected to the each first frame grabber, to store images photographed by the cameras according to photographing location and photographing time;~~

~~a GPS sensor to sense the photographing location and photographing time;~~

~~an annotation entering unit electrically connected to the GPS sensor to calculate location and time corresponding to each frame based on sensed data of the GPS sensor, the annotation entering unit being electrically connected to the storage means to enter the calculated location and time in each frame as annotation; and~~

~~a trigger signal generator electrically connected the storage means, the exposure signal generator, the annotation entering unit, the trigger signal generator selectively transmits a trigger signal to the exposure signal generator or the annotation entering unit in order that the cameras start to photograph the objects according to the trigger signal.~~

12. (new) The apparatus of claim 1, wherein the optical axes of the multiple cameras of the first multi-camera module are in a first plane and the optical axes of the multiple cameras of the second multi-camera module are in a second plane, the first and second planes being parallel to each other and perpendicular to the direction of height.

13. (new) The apparatus of claim 1, wherein each of the optical centers of the multiple cameras of the first multi-camera module is vertically aligned with one of the optical centers of the multiple cameras of the second multi-camera module.

14. (new) The apparatus of claim 13, wherein the optical axis of each of the multiple cameras of the first multi-camera module is parallel to the optical axis of a camera of the second multi-camera module that is vertically aligned with that multiple camera of the first multi-camera module.

15. (new) The apparatus of claim 13, wherein the optical axes of the multiple cameras of the first multi-camera module are in a first plane and the optical axes of the multiple cameras of the second multi-camera module are in a second plane, the first and second planes being parallel to each other and perpendicular to the direction of height.

16. (new) The apparatus of claim 1, wherein the plurality of multi-camera module includes a third multi-camera module at a third height.

17. (new) The method of claim 9, further comprising elevating the multi-camera module so that the optical centers of at least some of the cameras of the multi-camera module are moved from the first plane to the second plane to capture the first and second images.

18. (new) The method of claim 17, wherein the acquiring the second images includes acquiring the second images using cameras of the multi-camera module that differ from cameras of the multi-camera module used to acquire the first images.

19. (new) The method of claim 9, wherein each of the optical centers in the first plane is vertically aligned with one of the optical centers in the second plane.

20. (new) The method of claim 19, wherein the optical axis corresponding to each of the optical centers in the first plane is parallel to the optical axis corresponding to one of the optical centers in the second plane that is vertical aligned with that optical center.

21. (new) The method of claim 9, wherein the optical axes corresponding to the optical centers in the first plane are parallel to the optical axes corresponding to the optical centers in the second plane.

22. (new) The method of claim 9, wherein the first plane and the second plane are perpendicular to the direction of height.

23. (new) The method of claim 9, further comprising acquiring third images using the multi-camera module, including using at least some of the multiple cameras with the optical centers in a third plane at a third height to acquire the third images.

24. (new) The apparatus of claim 11, wherein the optical axes of the multiple cameras of the multi-camera module are in the plane.

25. (new) The apparatus of claim 11, wherein the multiple cameras of the multi-camera module are symmetrically arranged about a center point in the plane.

26. (new) A method for acquiring 3-dimensional data, the method comprising:

acquiring first images using a multi-camera module comprising multiple cameras at a first location, the optical centers of the multiple cameras being in a plane;

moving the multi-camera module from the first location to a second location;

acquiring second images using the multi-camera module at the second location;

searching corresponding points in at least one of the first images and in at least one of the second images;

extracting distance information for the corresponding points using trigonometry; and

acquiring 3-dimensional data based on the distance information.

27. The method of claim 26 wherein moving the multi-camera module includes moving the multi-camera module along a horizontal direction.

28. The method of claim 26 wherein moving the multi-camera module includes moving the multi-camera module along a vertical direction.

29. The method of claim 26 further comprising acquiring additional first images using additional cameras of the multi-camera module at the first location, the optical centers of the additional cameras being a different height than the optical centers of the multiple cameras, and wherein searching the corresponding points further includes searching the corresponding points in at least one of the additional first images.

30. (new) An omni-directional image and 3-Dimensional data acquisition apparatus, comprising:

a plurality of multi-camera modules, each multi-camera module constructed in a manner comprising a plurality of cameras that are symmetrically arranged with a specific point in a plane, each of the cameras taking charge of each of divided angles such that each multi-camera module can take an omni-directional continuous panoramic photograph of surrounding objects with the specific point;

first frame grabbers each of which is electrically connected to each of the cameras of each multi-camera module, to grab photographed images by frames;

an exposure calculator electrically connected to the first frame grabbers, to calculate exposure of each camera, based on the grabbed images by frames;

an exposure signal generator electrically connected to each camera, to transmit information about the exposure as a signal on the basis of the exposure calculated by the exposure calculator;

a plurality of light intensity sensors electrically connected to the exposure calculator to allow the exposure calculator to be able to calculate the exposure amount of the each camera based on external light intensity;

storage means electrically connected to the each first frame grabber, to store images photographed by the cameras according to photographing location and photographing time;

a GPS sensor to sense the photographing location and photographing time;

an annotation entering unit electrically connected to the GPS sensor to calculate location and time corresponding to each frame based on sensed data of the GPS sensor, the annotation entering unit being electrically connected to the storage means to enter the calculated location and time in each frame as annotation; and

a trigger signal generator electrically connected the storage means, the exposure signal generator, the annotation entering unit, the trigger signal generator selectively transmits a trigger signal to the exposure signal generator or the annotation

entering unit in order that the cameras start to photograph the objects according to the trigger signal; and wherein the multi-camera modules are vertically stacked and formed in at least two layers in the direction of height.

31. (new) An omni-directional image and 3-Dimensional data acquisition apparatus, comprising:

a plurality of multi-camera modules, each multi-camera module constructed in a manner comprising a plurality of cameras that are symmetrically arranged with a specific point in a plane, each of the cameras taking charge of each of divided angles such that each multi-camera module can take an omni-directional continuous panoramic photograph of surrounding objects with the specific point;

first frame grabbers each of which is electrically connected to each of the cameras of each multi-camera module, to grab photographed images by frames;

an exposure calculator electrically connected to the first frame grabbers, to calculate exposure of each camera, based on the grabbed images by frames;

an exposure signal generator electrically connected to each camera, to transmit information about the exposure as a signal on the basis of the exposure calculated by the exposure calculator;

storage means electrically connected to the each first frame grabber, to store images photographed by the cameras according to photographing location and photographing time;

a video camera electrically connected to the storage means via a second frame grabber for grabbing photographed moving pictures by frames, to the storage means a unique video clip corresponding to each image or image group to be stored in the storage means;

a GPS sensor to sense the photographing location and photographing time;

an annotation entering unit electrically connected to the GPS sensor to calculate location and time corresponding to each frame based on sensed data of the

GPS sensor, the annotation entering unit being electrically connected to the storage means to enter the calculated location and time in each frame as annotation; and

a trigger signal generator electrically connected the storage means, the exposure signal generator, the annotation entering unit, the trigger signal generator selectively transmits a trigger signal to the exposure signal generator or the annotation entering unit in order that the cameras start to photograph the objects according to the trigger signal; and wherein the multi-camera modules are vertically stacked and formed in at least two layers in the direction of height.

32. (new) An omni-directional image and 3-Dimensional data acquisition apparatus, comprising:

a plurality of multi-camera modules, each multi-camera module constructed in a manner comprising a plurality of cameras that are symmetrically arranged with a specific point in a plane, each of the cameras taking charge of each of divided angles such that each multi-camera module can take an omni-directional continuous panoramic photograph of surrounding objects with the specific point;

first frame grabbers each of which is electrically connected to each of the cameras of each multi-camera module, to grab photographed images by frames;

an exposure calculator electrically connected to the first frame grabbers, to calculate exposure of each camera, based on the grabbed images by frames;

an exposure signal generator electrically connected to each camera, to transmit information about the exposure as a signal on the basis of the exposure calculated by the exposure calculator;

storage means electrically connected to the each first frame grabber, to store images photographed by the cameras according to photographing location and photographing time;

a distance sensor and a direction sensor for respectively sensing the distance and direction of the image photographed by each camera;

a GPS sensor to sense the photographing location and photographing time;

an annotation entering unit electrically connected to the GPS sensor to calculate location and time corresponding to each frame based on sensed data of the GPS sensor, the annotation entering unit being electrically connected to the storage means to enter the calculated location and time in each frame as annotation; and

a trigger signal generator electrically connected the storage means, the exposure signal generator, the annotation entering unit, the trigger signal generator selectively transmits a trigger signal to the exposure signal generator or the annotation entering unit in order that the cameras start to photograph the objects according to the trigger signal; and wherein the multi-camera modules are vertically stacked and formed in at least two layers in the direction of height.